Journalism and Social Media as changing domain(s): Understanding behaviors and role-based emotions

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Abstract

The journalism domain continues to be redefined due to changes brought about by social media and digital technologies. The generation and production of news via contemporary journalism is partly characterized by negotiated balances across traditional practices and integrated participatory approaches. The changes in journalism are not simply driven by technologies, but by the extent of knowledge about domain tasks and professional behaviours. For these ends, this paper identifies domain vocabulary and journalism processes alongside tasks and role-based emotions. It brings to the foreground vital intersections across journalism, social media and online technologies, notably mainstream journalism practices that include crowdsourcing, editors' blogging, live-sites and semantic search optimization. These and other practices are explored in this paper via game design and ontologies and may inform future policy and guidelines as well as system ideas for training journalists. This paper was developed via data from participatory workshops with journalists and public relations professionals. It highlights journalism's unique function in society, partly reflected in new ideas for intelligent synthetic players that have knowledge of journalism processes and offer possibilities for exploring role-based emotions. A lite ontology approach also improves descriptions across the domains of journalism and social media, and this is also useful for contemplation of future systems.

1 Introduction

Newsgathering, editing and publishing in the second decade of the early 21st century is often carried out in online environments with database systems at the backend. For example, broadcasting institutions use customised database systems for online searching to improve sorting and retrieval of archived stories. Journalists also engage with particular software such as Twitterfall™ to monitor, filter and gather news via social media's micro-blogging streams like Twitter. This is part of the crowdsourcing process.

In 2008 journalism's increasing intersections with social media led to new policies and guidelines for journalists engaging with social media. Whilst there are variations in the guidelines, adoption by media organisations was on a global scale. By 2012 there were still gaps between some journalism practices and guidelines for emerging journalists. These gaps suggest that more guidelines are necessary for a generation of journalists who are 'digital natives' (Prensky, 2001), as well as other guidelines for established journalists negotiating social media and traditional values.

Journalism is also still adjusting to the speed of real-time communication via mobile devices, which impacts on the verification and development of stories. Nonetheless there are some solutions that balance real-time communication features, such as live blogging by editors and 'Live sites'. These sites are matched with relatively new roles to monitor and moderate information in a variety of ways. Three main types of moderation are used by the BBC, including: *reactive moderation* where visitors alert moderators to inappropriate comments; *pre-moderation* where moderators must see material before it is posted, especially in the area of children's media; and *post-moderation* where a moderator needs to remove material after it is posted (BBC, 2008). However, the events at the BBC in late 2012 that led to the resignation of the director general of the organization raised other problems for journalism and social media, which are not covered by guidelines. These issues could begin to be addressed by new depths of knowledge about the domain.

This paper combines information from participatory workshops with journalists and other participants (Dowd, 2011) with emerging knowledge of the domain. This knowledge could be useful for future learning systems that have synthetic players, in particular players that have knowledge of a journalist's behaviours and role-based emotions. An emerging ontology of 'things' in the journalism domain also begins to improve understanding as data emerges for Semantic Web applications. For that end, the intersections across journalism and social media need to shift from tacit to explicit knowledge, and that begins in this paper, via the highlights of journalism's function and its use of social media, which has distinct characteristics from other domains.

2 The rise of Social Media and Online systems used by Journalists

In November 2012 the director general of the BBC, George Entwistle, announced his resignation after less than two months in the position. This event raised multiple issues related to the impact of social media on journalism. Key associated social media factors are captured in the following extract by a long-term reporter at the BBC, Robinson:

> On 2 November Newsnight reported abuse victim … claims that a leading 1980s Tory politician was an abuser in north Wales, but he withdrew his accusation a week later, saying he had been mistaken. [The Tory politician], although not named on Newsnight, was identified on the internet as the subject of the allegations. He said the claims were "wholly false and seriously defamatory". Mr Entwistle had faced mounting criticism of his response to the programme in an interview …on BBC Radio 4's Today programme. He was criticised for … not being aware of a

> newspaper article, which revealed the mistaken identity, and for not knowing about a tweet saying Newsnight was poised to broadcast the revelations (Robinson, 2012).

Even though journalists use software tools such as Twitterfall™ to help monitor trends on Twitter, it is impossible to expect journalists, or a director, to know about every tweet. In 2012 Twitter generated '400 million tweets per day' (Farber, 2012). More importantly, the Newsnight story highlights a lack of policy that protects journalists where information is re-contextualized via social media; in particular, where something is 'inferred' via social media, but not actually said by a journalist. Inference via social media is not the responsibility of journalists, when they have not mentioned any particular name in a story. This scenario introduces a relatively new concept in journalism that could be referred to as an *inference risk*.

Following the BBC events in late 2012 a report was produced called the Ken MacQuarrie Report (BBCa, 2012). It included organizational change such as a return to 'single management to deal with all outputs, [and] in order to address the pressure on the Newsnight team, Karen O'Connor agreed to take on the role of Acting Editor of Newsnight' (BBCa, 2012). However, there was no mention of social media issues that had already impacted on the domain. At this time there was a simple note of caution about using social media via the Acting Head of News, Unsworth, reported in the following:

> Referring to the "tumultuous and very sad events of the past few days", Ms Unsworth sent an email to the corporation's staff saying: "It would be helpful if some of our problems were not played out publically across social media and in the pages of the national press" (Raynor, 2012).

Suddenly, the best of journalism was forced into a public relations mode and had to adopt the best in crisis communication methods. The decline in checks that were perhaps evident in the Newsnight story challenges the idea that 'the order of things in broadcast is "filter, then publish" [and] the order in communities is "publish, then filter"' (Lasica, 2003:70). The situation also suggests that management in broadcasting need to pay attention to what they know via social media, equally as much as editors. It is certainly not in anyone's interest in broadcasting if management have knowledge of something litigious via social media and make a claim that it 'would be "grotesque interference" to contact a program' (BBCb, 2012). Indeed, this suggests the need for a new set of social media guidelines for management levels in broadcasting. Existing guidelines cover only a limited number of issues such as 'blogging and microblogging in terms of integrity and impartiality for those working in news and current affairs' (BBC, 2008).

The rise of participatory media brought crowdsourcing directly into the journalism domain. Crowdsourcing actually began from 'cut prices in photos in the US due to distributed labour' (Howe, 2006). It was a business process understood in terms of 'a theory of crowd wisdom, … outperforming industry faster and cheaper than even the top minds in the fields' (Brabham, 2008). The term was integrated into the vocabulary of journalists, with newly contextualized meaning, evident in the conviction that 'one who finds and interviews a source using Twitter™, or crowd-sources case studies via the medium, is certainly reporting' (Posetti, 2009). However, reporting alone is not journalism, and crowdsourcing does not necessarily include sources of information, rather crowdsourcing in journalism requires significant checking of information if it is to satisfy the domain's values and standards.

Crowdsourcing problems for journalists are not new. From 2009 several issues leading to the moderation of online news content via social media emerged. Some of these problems included the use of Twitterfall™, which is used by journalists to track trends and conversations via Twitter. Twitterfall™ was designed by two computer science students, Somers and Brearley to improve the monitoring of tweets for newsgathering and other

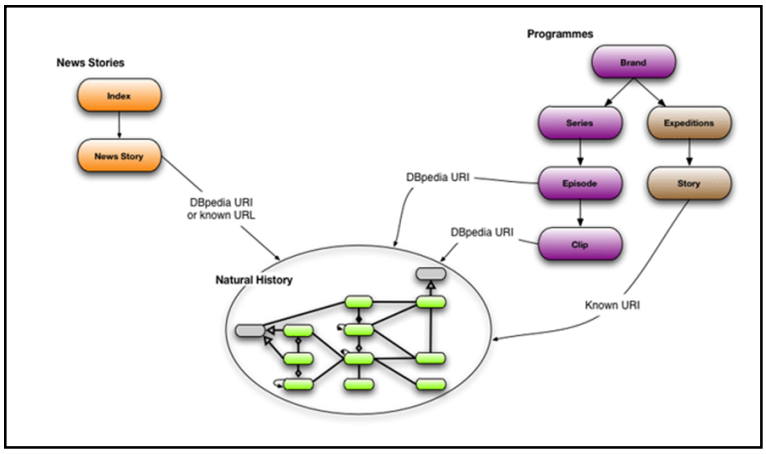
purposes (Beaumont, 2009). It includes settings that allow users to filter tweets based on location and language, as well as settings to control the speed at which tweets flow on screen. The use of Twitterfall™ in journalism did not have a smooth introduction. In 2009 *The Telegraph* in the U.K. discovered that a live Twitterfeed online was a mistake because public users could add hashtags and distort the purpose of the feed, as captured in the following:

> Twitter users quickly realised the feed was unmoderated, and spotting the potential for editorial sabotage, tweeted messages which were rather colourful. "Telegraph wankers #budget Didn't work" and "Silly paper messing with technology it doesn't understand #budget" were some of the tweets that got through before the paper pulled the plug on its live Twitterfall stream of budget hashtags. (Tran, 2009).

Live feeds were consistent with other participatory approaches that emerged in journalism at the time and the need for moderation of content was growing. The boundaries of information and sources for stories were not always clear when using real-time feeds. However, live event pages on news sites continue to provide running accounts of emerging stories, and tend to have disclaimers. Live site pages 'allow readers to keep up with the latest information circulating about a story, giving readers a sense of how people are reacting and what they are saying, in real time' (Cellan Jones, 2008). They also help journalists make sense of crisis situations. For example, following the Boston marathon bombs in April 2013, the live site used by the BBC (BBCc) included reporters blogging minute by minute with reports from police about the manhunt of a 19 year old suspect at large for 20 hours in a suburb of Boston. The BBC live site blog included moderated tweets from people locked in their suburban homes during the manhunt, which captured the fears and concerns of the community.

3. Understanding Journalism via Ontologies and Game Design

Contemporary online journalism uses various systems for the search and retrieval of archived stories. These systems include search optimization techniques that are only possible via high levels of structured data. For example, the BBC uses a Semantic Web tagging system called DBpedia (DBpedia) for structuring stories as resources. This system enables the use of a 'tag displayed as a link to an aggregation page for a concept' (Raimond, 2001). It aggregates concepts across programmes and news stories (see Figure 3) and across different sites, which benefits journalists as well as online media consumers when searching for items. It is a classification system that sorts an enormous amount of data to make it easier to retrieve via cross-referencing data. In order for it to work, the published content must be labeled with identifiers called URIs (Uniform Resource Identifiers) and the digital objects classified according to media types and logical associations across content. The system sorts search returns into categories with headings such as sport, natural history or news, making it easier to narrow down a search and follow up on a story.



Source: http://www.bbc.co.uk/blogs/bbcinternet/2010/02/case_study_use_of_semantic_web.html

Figure 3 The DBPedia model includes stories and programs labeled with Uniform Resource Identifiers (URIs) that are sorted into categories for search optimization.

The DBPedia system uses an ontology that defines the programme domain. Ontologies help to understand what is in a domain, such as broadcast content, through descriptions and articulations about that world. The root meaning of ontology is 'derived from a Greek word, a form of the verb "to be", that means being or existence' (Luger, 2009:10). In computing terms, an ontology is more specific and defined as 'an explicit formal specification of a conceptualization' (Gruber, 1993). Ontologies can be understood further as 'a particular system of categories accounting for a certain vision of the world…[where] the system does not depend on a particular [computing] language' (Guarino, 1998) and it requires 'specific vocabulary…to describe a certain reality [and] in the simplest case, an ontology describes a hierarchy of concepts' (Guarino, 1998: 2).

An ontology approach can also be used for understanding journalism and social media intersections as it aims to structure knowledge of each domain (see Figure 3.1). The elements in an ontology are referred to as 'things' and a social media 'thing' has relationships to other things in the journalism domain. An ontology will include slots for sub-class properties of 'things' as well as hierarchical relationships. A selection of 'things' in contemporary journalism includes live event sites and crowdsourcing with relationships to newsgathering. Although an aggregation, the blogosphere and tracking are social media things, they also belong in the journalism domain via newsgathering processes (see Figure 3.1).

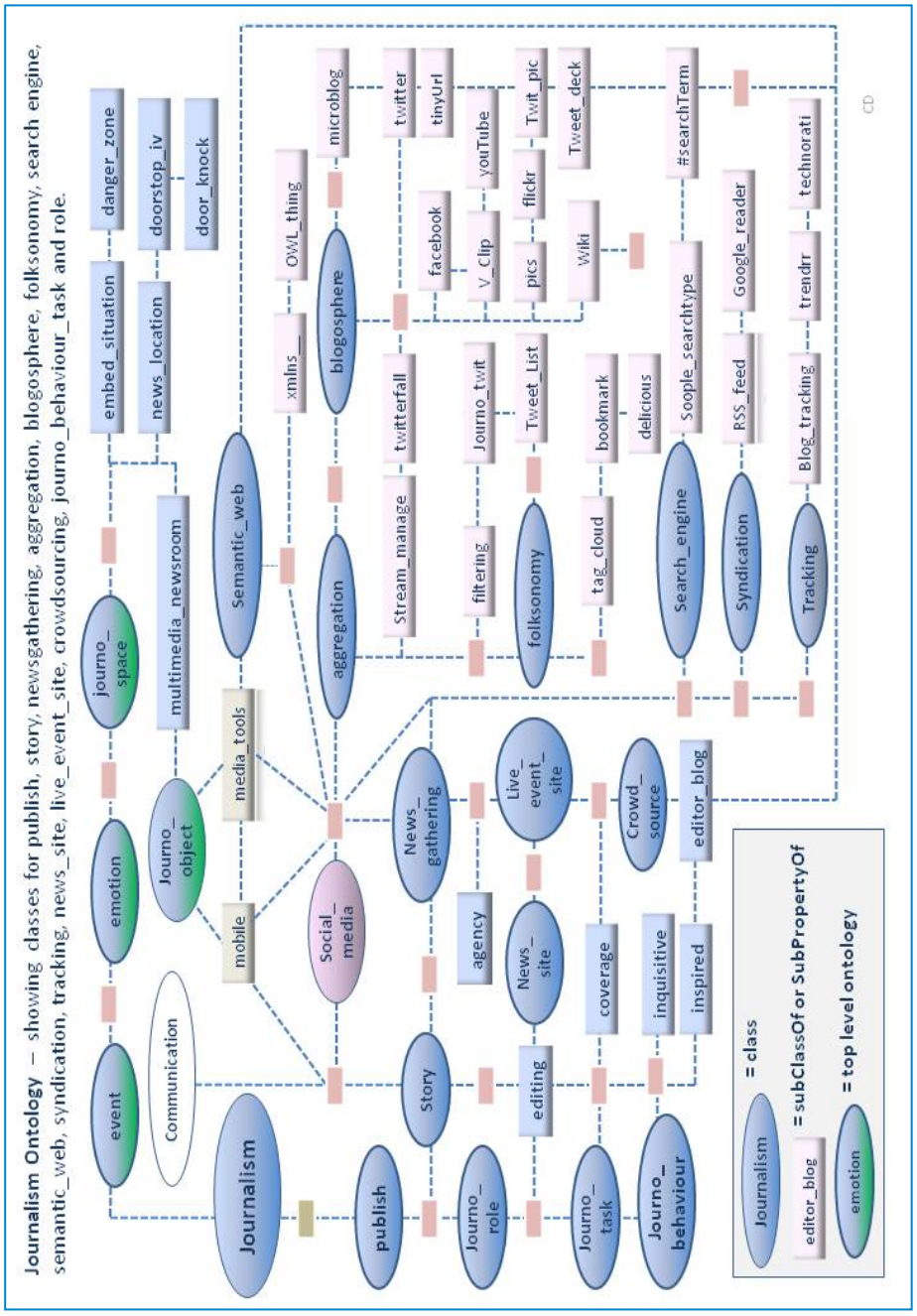


Figure 3.1 An emerging ontology for journalism with social media intersections.

Data objects in an ontology can have 'faceted' associations, i.e. an object has a relationship to other related objects. Abstract associations of objects are not new, they were first evident in printed books, as explained by Ong in the following:

> …a book was sensed as a kind of object which 'contained' information, scientific, fictional or other, rather than, as earlier, a recorded utterance…Each individual book in a printed edition was physically the same as another, an identical object, as manuscripts were not….with print, two copies of a given

> work did not merely say the same thing, they were duplicates of one another as objects (Ong, 1982).

The classification of books in earlier times has uncanny similarities to the digital age, including the concept of indexing and other issues associated with sorting information and defining relationships between 'things', again captured by Ong in the following:

> 'Index' is a shortened form of the original *index locorum* or *index locorum communium,* 'index of places' or 'index of common places'. Rhetoric has provided the various loci or 'places' – headings, we would style them – under which various 'arguments' could be found, headings such as cause, effect, related things, unlike things, and so on (Ong, 1982:125).

Contemporary library classification systems inform the frameworks for ontologies in computing via the Resource Description Framework (RDF). The RDF is the base for structuring data in libraries. RDF statements can be derived from an ontology in the form of axioms to assist reasoning about resources. These logical statements help to 'formulate, exchange and reason with knowledge about a domain of interest' (W3C). They constrain possible meaning as multiple statements are parsed using class assertions. In contemporary journalism social media could become a class represented as: ClassAssertion (a:Social_mediaMember a:twitter), which means Twitter is a member of Social_Media. These associations can also be represented in a graphic format (see figure 3.2).

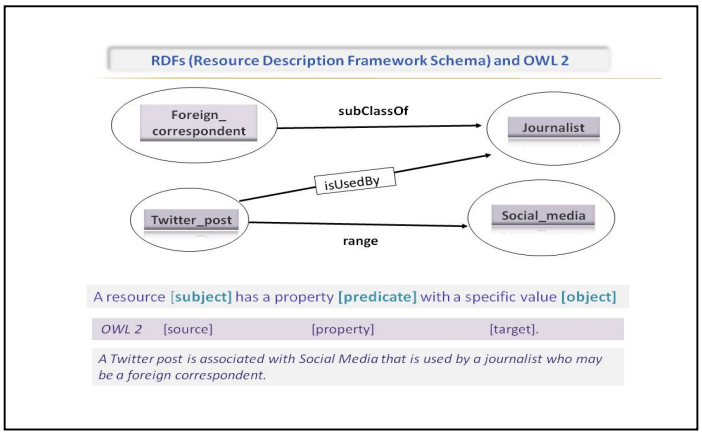


Figure 3.2 A graphic representation of a logical association across journalism and social media, showing that *A Twitter post is associated with Social Media that is used by a journalist who may be a foreign correspondent*.

RDF statements are necessary for computer machine readability. The terms can include the geographic location of a media resource, which may be described further in terms of current or archived media. The statements have a uniform structure of three parts that are like containers for binding data. In addition, a controlled vocabulary that is relevant to a knowledge domain can also be useful for semantic applications for the purposes of training or entertainment. For these ends, it is necessary to refine and articulate journalism processes, behaviours and vocabulary.

4. Emotions and Behaviors in Journalism: Towards Game Design

A typical business process model would not contain information about the emotions of actors in the model. However, emotions can be exploited to improve engagement in a game or simply help understand domain situations. This can be achieved via the 'epistemic frame of the professional' (Shaffer, 2013), which is used for role-playing approaches in games. Simulations also help 'to sharpen…insights and tools before they are applied to real-world problems with stakeholders' (Mayer and Veeneman, 2002) and can be useful even if they deviate from 'accurately representing real phenomena' (Crawford, 1997). These contexts have informed the following ideas for role-based emotions, which began via participatory workshops with journalists (Dowd, 2011). The data from these workshops was collected and synthesized for early design possibilities for Serious Games. A list of emotions (see Table 1) was derived from a core list of '3 to 11 primary or basic emotions, which includes fear, anger and sadness' (Plutchik, 2001). Although it is not wise to restrict human emotions and behaviors to 'two-state possibilities' (Adams and Rollings, 2007), knowledge of typical emotions before and after professional interactions could be useful for synthetic player ideas. A combination of roles, tasks and associated emotions were collated and combined by the author (see Table 1) using data from the participatory workshops conducted by Dowd.

Table 1. A list of role-based tasks or actions for journalists with emotions named before and after tasks.

Role	Task or Action of Journalist	Before interaction	After interaction
Newsgathering	Ascertain story – make calls	Curiosity	Satisfied
Newsgathering	Find opposing views	Frustration/panic	Completion/relief
News Editor	Checking for defamation	Anxiety	Relief
Editor	Decide approach to story, gather tips	Bargaining, curiosity	Understanding
Camera person	Get exclusive shot	Thrill	Smug
Editor	Apply values to news angle	Pressured	Smug/satisfied
Sub Editor	Headline meeting	Anxiety	Pleasure
Editor	Ask questions – police estimates of crowd numbers	Interested	Satisfied
Camera person	Get story information from journalist	Boredom	Contempt
Editor	Manage & prioritise news	Pulled in different directions	Bruised
Writer	Order information using editing tool	Panic	Satisfaction
Writer	Ascertain story, establish opinions/length & check facts	Anticipation, curiosity	Understanding, clarity
Photographer	Ascertain story, framing pics, options	Clarity, curiosity	Satisfaction, completion
Section editor	Establish story options, decide final story & layout	Bargaining, curiosity	Understanding, clarity
Editor	Rank stories for news bulletin	Chaos	Organization
Correspondent	Break new story – get a document no one else has	Competitive	Smug
News Editor	Monitor story from an agency	Satisfied	Excitement
Sub Editor	Legal advice: send script to in-house adviser via email	Hurried/seeking	

The datasets from Table 1 could be useful for a database of behavior and emotions for machine-readable purposes, but still require representative objects and logic systems. Dowd introduces further ideas at this level in the context of 'persuasive technologies' (see Dowd, 2013). For informative purposes the data on emotions and behaviours found in the journalism domain can be viewed as a tag cloud (see Figure 4), with characteristics such as curiosity and satisfaction amongst journalists in the foreground. The cloud also shows that anxiety, bargaining, clarity and understanding are quite strong in journalism. Characteristics, such as 'bargaining', can be regarded as having relatively new contexts in relation to social media, in particular via the process of crowdsourcing.

Figure 4 A cloud tag of role-based emotions in journalism.

There have been various attempts to transform knowledge of emotions and behaviours into computing languages, albeit not without challenges. One of these languages is the XML based language the 'Emotion Annotation and Representation Language' (EARL), which is described briefly in the following extract:

> (EARL – [3]), developed in the HUMAINE network on emotion-oriented computing, has made an attempt to broaden the perspective on representing emotion-related information. The EARL is a syntactically simple XML language designed specifically for the task of representing emotions and related information in technological contexts. It can represent emotions as categories, dimensions, or sets of appraisal scales. As different theories postulate different sets of emotion words, dimensions and appraisals, the design is modular, so that the appropriate set of descriptors for the target use can be chosen. In addition, a set of attributes can represent intensity and regulation-related information such as the suppression or simulation of emotion. Complex emotions, which consist of more than one "simple" emotion, can also be represented. A detailed specification including an XML schema can be found at http://emotion-research.net/earl (Schrőder et al., 2007: 441).

It is not surprising that the research group developing the markup language EARL regard the most difficult challenge as 'how to represent emotions' (Schrőder et al., 2007). Role-based emotions and behaviours in journalism could also be modelled as states and transitions and used for the design of synthetic players. A game player system could include pattern recognition to assist 'strategic decisions made for a long period of time [and] based on a large amount of data' (Smed and Hakonen, 2006: 117). Advanced approaches of this kind could be applied to Serious Games that develop real world knowledge of journalism. Following is an outline of several steps typically found in journalism in context of how press releases might be processed by an emerging synthetic player called Robo-Journo (Dowd, 2013).

Robo-Journo starts a cycle of typical but limited states, associated with the life of a press release, which includes checking information via social media to verify a story. Robo-

Journo determines if a role-playing journalist is in a good state to play, and if so, generates a press release to prompt a story. The player might show curiosity about the press release, in which case Robo-Journo requests that the player verify any story from the press release. The player then negotiates with other players to develop a story. If there is a lack of clarity about a potential story, then Robo-Journo can request opposing views. The synthetic player can also prompt a process of crowdsourcing, and seek further verifications. If a journalist is inspired to write a story, then Robo-Journo returns to base and starts the process over with another press release. If a journalist declares a press release not newsworthy then the press release goes in the trash. A player role-playing journalist can also use the press release to take another angle for a story and the synthetic player would then be given a low health status, in particular if a certain number of press releases do not produce any stories.

Robo-Journo knows certain things about journalism and could also be designed to respond to emotion inputs that partly drive a system. For a game system to emerge the behaviours in journalism could be explored as 'actions' in the domain. For this end, the author has developed an approach called the 'VerbIT' technique (see Table 2). The technique transforms statements that hold true in a domain, such as journalism, by taking important verbs and placing them at the front of a statement so that they become imperatives.

Table 2. Statements for Serious Game play using verbs and the imperative for action in the journalism domain.

Journalism game statements with *verbs* in front position (VerbIT technique)	**Possible player(s) interactions**
Persuade key talent to talk to journalist!	Seek out talent face to face.
Scooped by competitor – *cut-scoop*!	Journalist sees competitor's paper.
Seek out talent for face-to-face interview.	Journalist goes to a country to do a story, but doesn't get the story.
Sue for defamation on wrongful facts.	Reporter obtains information from PR person and accepts story at face value.
Discuss problems.	Talent gone – talk problem over with the boss.
Question	Phone slammed down – *should you* phone back?
Source (allegations).	Source grudge against person accused of bad behaviour.
Evaluate phone tip-off	Journalist picks up phone, considers, evaluates information from tip-off.
Confiscate equipment!	The journalist's equipment is likely to be confiscated.
Deny access during security check.	Seek alternative access.
Fear knowledge of illegal activity.	A personal source fears leak is traceable to them. Subject person of allegation (person to be named).
Write story on laptop.	Late for deadline – write in back of car.
Pay fee for exclusive information.	Exclusive information – do you buy or not?
Promote to foreign correspondent.	Your name at head of news bulletin.
Expose corrupt Public Figure.	Public Figure resigns.
Publish story.	Public Figure resigns.
Win an award.	Story followed up by newspapers – win Walkley award.
Investigate further a wrong story.	Journalist story is wrong. Hand back Walkley Award.

Reveal evidence.	Story published with new evidence.
Balance the story.	Critics say your story is unbalanced, show both sides.
Contest allegations.	Politician claims of being misquoted. Journalist has information on tape.
Attack on journalist's story.	Government attack on a story – must investigate.
Arrest journalist (and crew by soldiers).	TV crew incarcerated for attending illegal rally – crew and journalist jailed. Fixer brings help to jail.

The 'VerbIT' technique emphasizes 'action' that would be required by either a synthetic or real player. The verbs also inform further the characteristics of journalists in a role with many instances that reflect journalism's long-standing ethics and temptations, from *exposing* corrupt public figures to obtaining *scoops*.

Conclusion

This paper has captured several major transitions in the journalism domain and highlights social media impacts on journalism in terms of process and behaviours. It proposes methods for deeper understanding of journalism in the era of social media and real time online communication via ontologies and Serious Game design. It recommends exploration across journalism and social media towards new policy and guidelines for management of mainstream broadcasting. Apart from structured and formal approaches to the intersections across journalism and social media, such as crowdsourcing in the context of journalism processes, it offers ideas and opportunities for play, learning and new understandings of early 21st century journalism.

Journalists intersect with social media, in terms of process, behaviours and emotions, in ways that set them apart from other professions. Public relations professionals may use the same software and digital artifacts as journalists, but they use them for different ends, and each domain serves a different function. For example, *tracking* and *blogging* via social media for journalism has direct relationships to *newsgathering* and the generation of stories, whereas tracking in public relations tends to be for *education* and *re-education*. The latter vocabulary was not evident amongst journalists who participated in workshops for this research, but it was evident amongst public relations professionals. Journalism continues to seek truth as it pursues stories, but as players journalists must be vigilant as they verify stories and make discernments across the folksonomies created via social media. In time artificial agents could be watching the game play of online journalists.

References

Adams, E, & Rollings, A, 2007, *Game Design and Development*. Pearson Prentice Hall, Upper Saddle River.

Alesso, HP & Smith, CF, 2006, *Thinking on the Web: Berners-Lee, Gödel, and Turing.* John Wiley & Sons Inc, New Jersey.

Beaumont, C, 2009, *Twitterfall: A Google for the Twitterverse*, The Telegraph, London, viewed 1st March 2013, http://www.telegraph.co.uk/technology/twitter/4948275/Twitterfall-a-Google-for-the-Twitterverse.html

BBC, 2008, *Social Networking, Microblogs and other Third Party Websites: Personal Use*, London, viewed 27th February 2013, http://www.bbc.co.uk/editorialguidelines/page/guidance-blogs-personal-full

BBCa, 2012, *Ken MacQuarrie report: Summary of findings*, viewed 26th February 2013, http://www.bbc.co.uk/news/uk-20306096.

BBCb, 2012*, BBC needs 'radical overhaul', says Lord Patten*, viewed 26th February 2013, http://www.bbc.co.uk/news/uk-20286198 .

BBCc, 2013, *As it happened: Manhunt for Boston bomb suspect*, viewed 19th April 2013, http://www.bbc.co.uk/news/world-us-canada-22213651.
Brabham, D, 2008, 'Crowdsourcing as a Model for Problem Solving: An Introduction and Cases' in *Convergence: The International Journal of Research into New Media Technologies*. 14:1, 75-90
Cellan-Jones, R., 2008, *Twitter – the Mumbai myths,* http://www.bbc.co.uk/blogs/technology/2008/12/twitter_the_mumbai_myths.html
Crawford, C, 1997, *The art of Computer Game Design*, Washington State University, Washington. http://library.vancouver.wsu.edu/art-computer-game-design.
DBpedia, 2013, *Dbpedia*, viewed 27th February 2013, http://dbpedia.org/About
Dowd, C, 2011, 'The Scrabble of Language for Real-time Crisis Communication: Serious Game Design for Journalism, Social Media and Public Relations', unpublished PhD thesis, CSU.
Dowd, C, 2013, 'The Scrabble of Language towards Persuasion: Changing Behaviors in Journalism', in S. Berkovksy and J. Freyne (eds), *Persuasive Technology*, LNCS 7822, Springer, Heidelberg.
Farber, D. 2012, *Twitter hits 400 million tweets per day,* viewed 25th January 2013, http://news.cnet.com/8301-1023_3-57448388-93/twitter-hits-400-million-tweets-per-day-mostly-mobile/
Gruber, T, 1993, 'A Translation Approach to Portable Ontology Specifications' in *Knowledge Acquisition.* 5:2, 199-220.
Guarino, N, 1998, 'Formal Ontology and Information Systems', in FOIS '98, Trento
Howe, J, 2006, *The Rise of Crowdsourcing*, viewed 1st March 2013, http://www.wired.com/wired/archive/14.06/crowds.html
Lasica, J, 2003. 'Blogs and Journalism Need Each Other', viewed 1st March 2013, http://www.nieman.harvard.edu/reports/contents.html
Luger, G, 2009, *Artificial Intelligence Structures and Strategies for Complex Problem Solving.* Pearson Education, Boston.
Mayer, I. and Veeneman, W, 2002, *Games in a World of Infrastructures: Simulation Games for research, learning and intervention*. Eburon, Delft.
Ong, W, 1982, *Orality and Literacy*. Routledge, London.
Posetti, J, *Twitter as a Journalistic Tool: Drilling Beneath the Rhetoric*, viewed 1st March 2013, http://www.j-scribe.com/2009/11/twitter-as-journalistic-tool-drilling.html
Prensky, M, 2001, 'Digital Natives, Digital Immigrants', *On The Horizon*. Vol 9:5, 1-6.
Raynor, G., *BBC news chief pleads with staff not to Tweet about 'our problems'*, viewed 1st March 2013, http://www.telegraph.co.uk/culture/tvandradio/bbc/9674996/BBC-news-chief-pleads-with-staff-not-to-Tweet-about-our-problems.html
Robinson, N, 2012, *BBC not facing "existential crisis," says No 10*, viewed 26th January 2013, http://www.bbc.co.uk/news/uk-politics-20287066
Shaffer, D, 2011, *Epistemic Games Group*, viewed 25th January 2013, http://epistemicgames.org/eg/?p=414#more-414
W3C, 2009, *OWL2 Web Ontology Language: RDF-Based Semantics,* viewed 25th January 2013, http://www.w3.org/TR/2009/REC-owl2-rdf-based-semantics-20091027/
Plutchik, R, 2001, 'The Nature of Emotions: Human emotions have deep roots, a fact that may explain their complexity and provide tools for clinical practise'. *American Scientist*, 89:4, 344-350.
Raimond, Y, Scott, T, Sinclair, P, Miller, L, Betts, S, McNamara, F, et al., 2001, *Case Study: Use of Semantic Web Technologies on the BBC Web Sites,* viewed 19th April 2013, http://www.w3.org/2001/sw/sweo/public/UseCases/BBC/
Schröder, M, Devillers, L, Karpouzis, K, Martin, J, Pelachaud, C, Peter, C, et al., 2007, *What Should a Generic Emotion Markup Language Be Able to Represent?,* Vol. 4738, Berlin: Springer-Verlag.
Smed, J, Hakonen, H, 2006, *Algorithms and Networking for Computer Games*. John Wiley & Sons, England.
Tran, M, 2009, 'Twitterfall becomes TwitterFAIL for Telegraph's budget coverage', viewed 25th January 2013, http://www.guardian.co.uk/media/2009/apr/21/telegraph-twitter-budget-twitterfall-embarrassment